BRIDGEWATER GROUP, INC.

Phase 2 Basin 2 Storm Water Monitoring Plan
Burgard Industrial Park - SSI Area
Portland, Oregon

TO: Jim Orr/Oregon DEQ

CC: Mat Cusma/Schnitzer
Mark Bartee/Schnitzer

FROM: Ross Rieke/Bridgewater Group

DATE: September 16, 2015

This memorandum presents the Phase 2 Basin 2 storm water monitoring plan (Phase 2 Monitoring Plan) that will be implemented at the Schnitzer Steel Industries (SSI) site within the Burgard Industrial Park (BIP) in Portland, Oregon (Site) (Figures 1 and 2). The purpose of the Basin 2 Monitoring Plan is to document that upcoming additional storm water treatment being implemented in Basin 2, along with existing site Best Management Practices (BMPs), provides sufficient source control under the Oregon Department of Environmental Quality (DEQ) Portland Harbor source control program.

The Basin 2 storm water treatment improvements are being implemented pursuant to a Tier II Corrective Action Plan (Tier II CAP) developed in accordance with the facility's storm water National Pollutant Discharge Elimination System (NPDES) general storm water discharge permit (file number 108103). The Tier II CAP is presented in the site's December 2014 *Storm Water Pollution Control Plan*. The City of Portland (delegated by DEQ to implement the NPDES general storm water permit within the City) approved the Tier II CAP in their March 31, 2015 letter. A separate storm water monitoring program will be performed under the NPDES Tier II CAP. Data collected to comply with the NPDES permit monitoring program may be used to address the requirements of this Phase 2 Monitoring Plan, as appropriate.

Storm Water Treatment Improvements

Storm water runoff from Basin 2 is currently collected through a series of catch basins and conveyed to a sump where the water is pumped through 150-micron screen filters to a one-million gallon storage tank. The storage tank allows some additional settling of the storm water, attenuates storm events, and is configured to allow collected storm water to be used as makeup water in the shredder cooling system or to fill water trucks for Site roadway dust suppression. Excess storm water is periodically discharged through a buried pipe to an existing 30-inch diameter steel outfall on the bank of the Willamette River (Outfall 2). This discharge is permitted and monitored under the facility's NPDES general storm water permit. A Phase 1 storm water monitoring program was completed in 2010/2011 to assess the effectiveness of this existing storm water treatment system.

The additional storm water treatment features being constructed to supplement the above treatment system include:

- Electrocoagulation (EC) treatment system which coagulates fine particles, oxidizes metals, precipitates contaminants, and de-emulsifies emulsified oils;
- Clarification and filtration system where coagulated solids, fines, and heavy metal ions are removed; and

- Granular activated carbon (GAC) polishing filtration system.

The system will treat all excess storm water released from the storage tank prior to discharge to the Willamette River through the existing 30-inch diameter steel outfall. The new treatment system is designed for a 600 gpm flow capacity.

The additional storm water treatment features will be installed during Fall 2015 and are anticipated to be fully operational by the end of 2015. This Basin 2 Monitoring Plan will be implemented in late 2015 and early 2016, once the additional treatment features are completed and the system is fully operational.

The Tier II CAP also includes diversion of storm water runoff collected from Basin 1 (Figure 2) and conveying the water to the Basin 2 collection system for subsequent treatment. The conveyance of Basin 1 runoff to the Basin 2 treatment system will be completed by the end of the second quarter of 2016 (as required by the NPDES permit conditions). Additional monitoring of the Basin 2 treatment system effluent (e.g., Phase 3), beyond the scope described in this Basin 2 Monitoring Plan, is anticipated once the basin consolidation work is completed.

Sampling Location, Frequencies, and Conditions

Water samples will be collected from Outfall 2 during discharge of treated, excess storm water. Each sample will be collected at the estimated middle of the discharge volume based on the tank level indicator.

Two treatment system discharge water samples will be collected. There will be at least one week between samples and at least 0.1 inches of precipitation will occur between samples. Samples will be collected no closer than one week. The nature of the rainfall event(s) that initially generated the stored storm water (i.e., rainfall intensities and durations), and duration of precedent dry periods will be noted for each event.

Chemical Analysis of Storm Water Samples

Based on the results of previous Basin 2 storm water sampling and analysis, storm water samples will be analyzed for the following:

- PCB aroclors, homologs, and congeners;
- Phthalates;
- Dioxins/furans;
- Butyltins;
- Total and dissolved metals: aluminum, antimony, arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, silver, and zinc;
- Polycyclic aromatic hydrocarbons (PAHs);
- Organochlorine pesticides;
- Total Petroleum Hydrocarbons (gasoline, diesel, and heavy oil);
- Total suspended solids (TSS); and
- Total organic carbon (TOC)

QA/QC Procedures

To ensure comparability and accuracy of the analytical laboratory analyses, standard sample collection and handling procedures will be used to collect the samples and standard analytical laboratory methods will be used to analyze the samples. Table 1 shows the specific analytical methods, laboratory containers, holding times, and preservatives to be used for each parameter for the storm water analysis. Table 2 shows the analytical laboratory detection limits for each chemical for the storm water analysis and compares the limits to the JSCS SLVs. As noted on Table 2, the laboratory detection limits are approximately equal to or less than the JSCS SLVs except for chlorinated pesticides, dioxins, and a few metals.

Standard analytical laboratory QA/QC procedures, including surrogates, method blanks, method spikes, and laboratory duplicates, will be followed. Each analytical laboratory report will be reviewed to assess the results of the analytical laboratory QA/QC procedures. In particular, surrogate recoveries, laboratory and matrix spike recoveries, and laboratory duplicate relative-percent-differences (RPDs) will be reviewed to assess compliance with laboratory control limits. Laboratory blanks will be reviewed for presence of analytes and detection limits will be compared to target method detection limits.

Sampling and Analysis Results Reporting

A data memorandum will be submitted to DEQ within 30 days of receipt of the final analytical laboratory report for the second sampling event. The data report will include tables presenting results of the laboratory analysis and a comparison with JSCS SLVs. The data report will also include a comparison with the "Stormwater Charts" presented in Appendix E of DEQ's *Guidance for Evaluating Stormwater at Upland Sites*. The approximatetime the collected water had been stored in the tank, the nature of the rainfall event(s) that initially generated the stored storm water (i.e., rainfall intensity and duration), and duration of the precedent dry period(s) will be presented for each sampling event. Finally, the data report will note the results of the analytical laboratory data QA/QC review and any corrective action determined to be necessary from the review.

Attachments:

Table 1 Water Analytical Laboratory Methods, Sample Containers, Holding Times, and Preservation

Table 2 Water Analytical Laboratory Detection Limits

Figure 1 Site Location Map

Figure 2 Site Plan

Figure 3 Basin 2 Drainage Area and Storm Water Management Features

Tables

Table 1
Water Analytical Laboratory Methods, Sample Containers, Holding Times, and Preservation
Basin 2 Storm Water Monitoring Plan

Analytical Parameter	Analytical Method	Container	Holding Time	Preservation
Aluminum Antimony, Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Silver, Zinc	EPA 6020	500-ml HDPE bottle	6 months Hg 28-days	HNO_3 pH<2, 4 ±2°C
Tributyltin	KRONE	1-liter amber	7 day extract 40 days analysis	4 ±2°C
PCB Aroclors, Congeners, and Homologs	EPA 1668A	1-liter amber	1 year	4 ±2°C
Dioxins/furans	EPA 8290	1-liter amber	1 year	4 ±2°C
Phthalates	EPA 8270SIM	1-liter amber	7 day extract 40 days analysis	4 ±2°C
PAHs	EPA 8270SIM	1-liter amber	7 day extract 40 days analysis	4 ±2°C
Organochlorine Pesticides	EPA 8081	1-liter amber	7 day extract 40 days analysis	4 ±2°C
Total Organic Carbon	SM 5310 Mod	250-ml HDPE bottle	28 days	H_2SO_4 pH<2, 4 ±2°C
Total Petroleum Hydrocarbons	NW-TPH Methods	1-liter amber	7 day extract 40 days analysis	4 ±2°C
Total Suspended Solids	SM 2540D	250-ml HDPE bottle	7 days	4 ±2°C

Table 2
Water Analytical Laboratory Detection Limits
Basin 2 Storm Water Monitoring Plan

Chemical	Portland Harbor JSCS SLV[1]	Analytical Laboroatory Detection Limit
PAHs (ug/l)		
2-Methylnaphthalene		0.020
Acenaphthene	0.2	0.010
Acenaphthylene	0.2	0.010
Anthracene		0.010
Benzo(a)anthracene	0.018	0.010
Benzo(a)pyrene	0.018	0.015
Benzo(b)fluoranthene	0.018	0.015
Benzo(g,h,i)perylene	0.2	0.010
Benzo(k)fluoranthene	0.018	0.015
Chrysene	0.018	0.010
Dibenzo(a,h)anthracene	0.018	0.010
Fluoranthene	0.2	0.010
Fluorene	0.2	0.010
Indeno(1,2,3-cd)pyrene	0.018	0.010
Naphthalene	0.2	0.020
Phenanthrene	0.2	0.010
Pyrene	0.2	0.010
Dibenzofuran	3.7	0.010
PCBs (ug/l)		
Aroclor 1016	0.96	0.02
Aroclor 1221	0.034	0.02
Aroclor 1232	0.034	0.02
Aroclor 1242	0.034	0.02
Aroclor 1248	0.034	0.02
Aroclor 1254	0.034	0.02
Aroclor 1260	0.034	0.02
Aroclor 1262		0.02
Aroclor 1268		0.02
PCB Congeners (pg/l)		
PCB001		0.5
PCB002		0.5
PCB003		0.5
PCB004 & 010		0.5
PCB005 & 008		0.5
PCB006		0.5
PCB007 & 009		0.5
PCB011		0.5
PCB012 & 013		0.5
PCB014		0.5
PCB015		0.5
PCB016 & 032		0.5
PCB017		0.5
PCB018		0.5
PCB019		0.5
PCB020 & 021 & 033		0.5
PCB022		0.5
PCB023		0.5
PCB024 & 027		0.5
PCB025		0.5
PCB026		0.5
PCB028		0.5
PCB029		0.5
PCB030		0.5
PCB031		0.5
PCB034		0.5
PCB035		0.5
PCB036		0.5
PCB037		0.5
PCB038		0.5
PCB039		0.5
PCB040		0.5
PCB041 & 064 & 071 & 072		0.5
PCB042 & 059		0.5
PCB043 & 049		0.5
PCB044		0.5
PCB045		0.5
PCB046		0.5
PCB047		0.5
PCB048 & 075		0.5
PCB050		0.5
PCB051		0.5
PCB052 & 069		0.5
PCB053		0.5
PCB054		0.5
PCB055		0.5
PCB056 & 060		0.5
PCB057		0.5
PCB058		0.5
PCB061 & 070		0.5
PCB062		0.5
PCB063		0.5

Table 2
Water Analytical Laboratory Detection Limits
Basin 2 Storm Water Monitoring Plan

Chemical	Portland Harbor JSCS SLV[1]	Analytical Laboroatory Detection Limit
PCB065		0.5
PCB066 & 076		0.5
PCB067		0.5
PCB068		0.5
PCB073		0.5
PCB074		0.5
PCB077		0.5
PCB078		0.5
PCB079		0.5
PCB080		0.5
PCB081		0.5
PCB082		0.5
PCB083		0.5
PCB084 & 092		0.5
PCB085 & 116		0.5
PCB086		0.5
PCB087 & 117 & 125		0.5
PCB088 & 091		0.5
PCB089		0.5
PCB090 & 101		0.5
PCB093		0.5
PCB094		0.5
PCB095 & 098 & 102		0.5
PCB096		0.5
PCB097		0.5
PCB099		0.5
PCB100		0.5
PCB103		0.5
PCB104		0.5
PCB105		0.5
PCB106 & 118		0.5
PCB107 & 109		0.5
PCB108 & 112		0.5
PCB110		0.5
PCB111 & 115		0.5
PCB113		0.5
PCB114		0.5
PCB119		0.5
PCB120		0.5
PCB121		0.5
PCB122		0.5
PCB123		0.5
PCB124		0.5
PCB126		0.5
PCB127		0.5
PCB128 & 162		0.5
PCB129		0.5
PCB130		0.5
PCB131		0.5
PCB132 & 161		0.5
PCB133 & 142		0.5
PCB134 & 143		0.5
PCB135		0.5
PCB136		0.5
PCB137		0.5
PCB138 & 163 & 164		0.5
PCB139 & 149		0.5
PCB140		0.5
PCB141		0.5
PCB144		0.5
PCB145		0.5
PCB146 & 165		0.5
PCB147		0.5
PCB148		0.5
PCB150		0.5
PCB151		0.5
PCB152		0.5
PCB153		0.5
PCB154		0.5
PCB155		0.5
PCB156		0.5
PCB157		0.5
PCB158 & 160		0.5
PCB159		0.5
PCB166		0.5
PCB167		0.5
PCB168		0.5
PCB169		0.5
PCB170		0.5
PCB171		0.5
PCB172		0.5
PCB173		0.5
PCB174		0.5
PCB175		0.5

Table 2
Water Analytical Laboratory Detection Limits
Basin 2 Storm Water Monitoring Plan

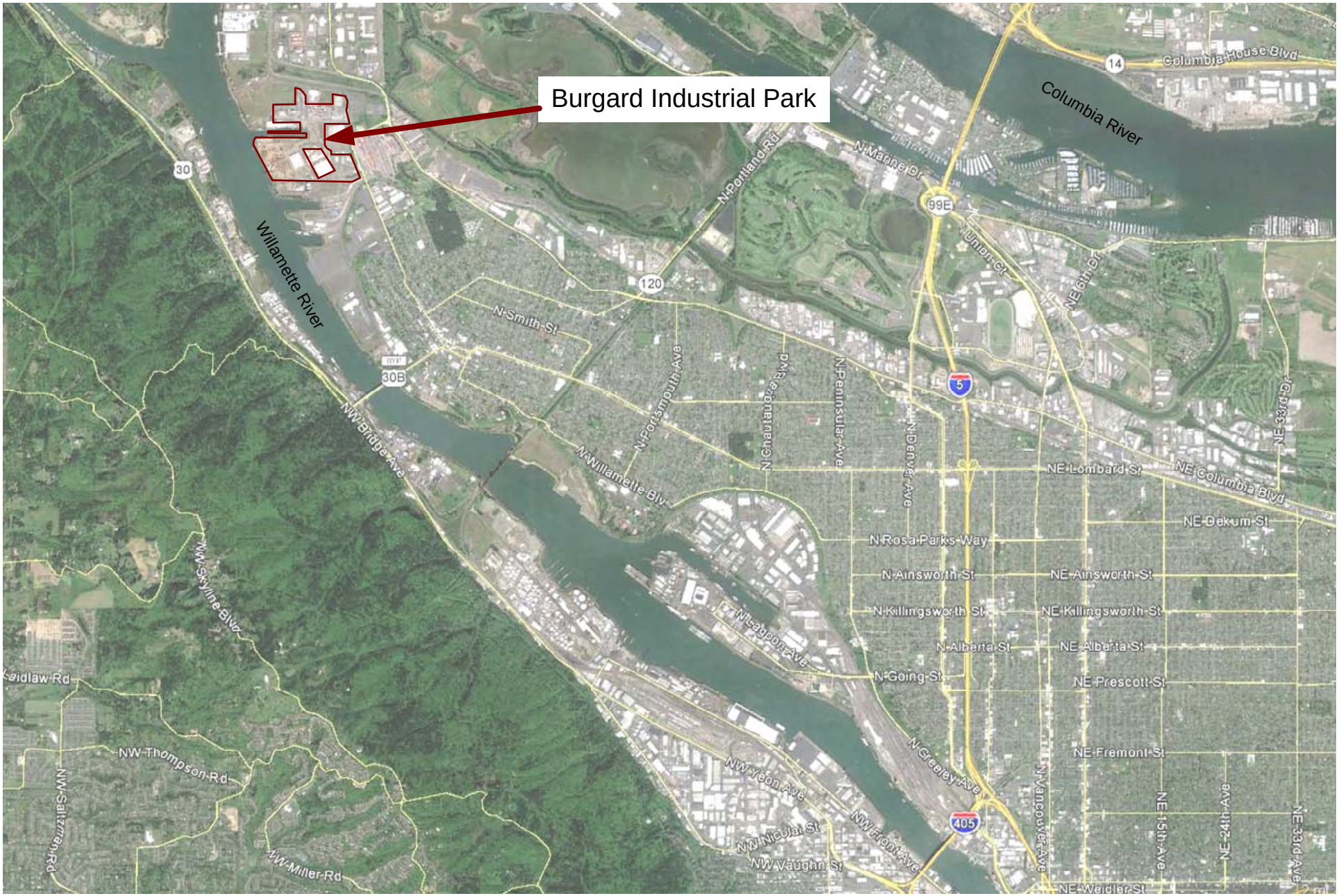
Chemical	Portland Harbor JSCS SLV[1]	Analytical Laboroatory Detection Limit
PCB176		0.5
PCB177		0.5
PCB178		0.5
PCB179		0.5
PCB180		0.5
PCB181		0.5
PCB182 & 187		0.5
PCB183		0.5
PCB184		0.5
PCB185		0.5
PCB186		0.5
PCB188		0.5
PCB189		0.5
PCB190		0.5
PCB191		0.5
PCB192		0.5
PCB193		0.5
PCB194		0.5
PCB195		0.5
PCB196 & 203		0.5
PCB197		0.5
PCB198		0.5
PCB199		0.5
PCB200		0.5
PCB201		0.5
PCB202		0.5
PCB204		0.5
PCB205		0.5
PCB206		0.5
PCB207		0.5
PCB208		0.5
PCB209		0.5
Total PCB congeners	64	1 to 30
PCB Homologs (pg/l)		
Monochlorobiphenyl		0.5
Dichlorobiphenyl		0.5
Trichlorobiphenyl		0.5
Tetrachlorobiphenyl		0.5
Pentachlorobiphenyl		0.5
Hexachlorobiphenyl		0.5
Heptachlorobiphenyl		0.5
Octachlorobiphenyl		0.5
Nonachlorobiphenyl		0.5
Total PCBs (Method 1668)	64	0.5
Phthalates (ug/l)		
Bis(2-ethylhexyl) phthalate	2.2	0.3
Butylbenzyl phthalate	3	0.3
Dibutyl phthalate	3	0.3
Diethyl phthalate	3	0.3
Dimethyl phthalate	3	0.3
Di-n-octyl phthalate	3	0.3
Pesticides (ug/l)		
2,4'-DDD	0.00031	0.01
2,4'-DDE	0.00022	0.01
2,4'-DDT	0.2	0.01
4,4'-DDD	0.00031	0.01
4,4'-DDE	0.00022	0.01
4,4'-DDT	0.00022	0.01
Aldrin	0.00005	0.01
alpha-Endosulfan	0.051	0.01
alpha-Hexachlorocyclohexane	0.0049	0.01
beta-Endosulfan	0.051	0.01
beta-Hexachlorocyclohexane	0.017	0.01
cis-Chlordane	0.00081	0.01
cis-Nonachlor	0.19	0.01
delta-Hexachlorocyclohexane	0.052	0.01
Dieldrin	0.000054	0.01
Endosulfan sulfate	89	0.01
Endrin	0.036	0.01
Endrin aldehyde		0.01
Endrin ketone		0.01
gamma-Hexachlorocyclohexane	0.037	0.01
Heptachlor	0.000079	0.01
Heptachlor epoxide	0.000039	0.01
Hexachlorobenzene	0.00029	0.01

Table 2
Water Analytical Laboratory Detection Limits
Basin 2 Storm Water Monitoring Plan

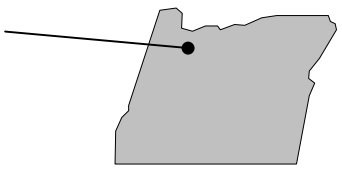
Chemical	Portland Harbor JSCS SLV[1]	Analytical Laboroatory Detection Limit
Hexachlorobutadiene	0.86	0.01
Hexachloroethane	3.3	0.01
Methoxychlor	0.03	0.01
Mirex		0.01
Oxychlordane	0.19	0.01
Toxaphene	0.0002	0.01
trans-Chlordane	0.00081	0.01
trans-Nonachlor	0.19	0.01
Dioxins (pg/l)		
1,2,3,4,6,7,8-HeptaCDF		1.0
1,2,3,4,6,7,8-HeptaCDD		1.0
1,2,3,4,7,8,9-HeptaCDF		1.0
1,2,3,4,7,8-HexaCDF		1.0
1,2,3,4,7,8-HexaCDD		1.0
1,2,3,6,7,8-HexaCDF		1.0
1,2,3,6,7,8-HexaCDD		1.0
1,2,3,7,8,9-HexaCDF		1.0
1,2,3,7,8,9-HexaCDD		1.0
1,2,3,7,8-PentaCDF		1.0
1,2,3,7,8-PentaCDD		1.0
2,3,4,6,7,8-HexaCDF		1.0
2,3,4,7,8-PentaCDF		1.0
2,3,7,8-TetraCDF		1.0
2,3,7,8-TetraCDD	0.0051	1.0
HeptaCDF homologs		
HeptaCDD homologs		
HexaCDF homologs		
HexaCDD homologs		
OCDF		1.5
OCDD		1.5
PentaCDF homologs		
PentaCDD homologs		
TetraCDF homologs		
TetraCDD homologs		
Total 2,3,7,8-TetraCDD TEQ Eq	0.0051	1.3
Butyltins (ug/l)		
Butyltin ion		0.20
Dibutyltin ion		0.30
Tributyltin ion	0.072	0.076
Tetrabutyltin		
Metals (ug/l)		
Aluminum		4.0
Antimony	6	0.50
Arsenic	0.045	0.50
Cadmium	0.094	0.50
Chromium	100	0.50
Copper	2.7	1.0
Lead	0.54	0.50
Manganese	50	0.50
Mercury	0.77	0.040
Nickel	16	0.50
Selenium	5	0.50
Silver	0.12	0.50
Zinc	36	2.0
Pertroleum Hydrocarbons (mg/l)		
Gasoline	1	0.1
Diesel	1	0.1
Oil	1	0.2
TSS (mg/l)		5

1 - Table 3-1 PH JSCS Guidance, 7/16/2007 revision

Figures



Portland, Oregon



N

Approximate Scale

5000 feet

Base photograph April 2015

Figure 1
Site Location Map
Burgard Industrial Park

BRIDGEWATER GROUP, INC.

Base photograph April 2015

Figure 2
Site Plan
Burgard Industrial Park
Portland, Oregon

BRIDGEWATER GROUP, INC.

- Catch Basin
- Manhole
- Storm Water Collection Line
- Storm Water Force Main
- Storm Water Discharge Line

Approximate Scale

200 feet

N

Base photograph April 2015

Figure 3

Basin 2 Drainage Area and Storm Water Management Features
Burgard Industrial Park

BRIDGEWATER GROUP, INC.